Survey questionnaire sent to participating CHNC ECMO centers

Survey of Ventilator Management During Neonatal Respiratory ECMO

Please respond in the context of neonatal ECMO for respiratory indications

1. **Please identify your neonatal ECMO center.**
    a. **[ ]**
2. **At your facility, where are neonatal respiratory ECMO runs managed?**
    a. **NICU**
    b. **PICU**
    c. **CVICU**
    d. **Other [ ]**
3. **Do you have a stand-alone ECMO team managing patients?**
    a. **Yes**
        i. **If YES, is ventilator and respiratory care while on ECMO managed by the primary Neonatology team or the ECMO team?**
            1. **Neonatology service**
            2. **ECMO Team**
    b. **No**
4. **What is the background of the physicians managing the ventilator during neonatal ECMO? Select all that apply.**
    a. **Neonatologists**
    b. **Pediatric Intensivists**
    c. **Cardiac Intensivists**
    d. **Cardiac Surgeons**
    e. **Pediatric Surgeons**
    f. **Other [ ]**
5. **Which of the following most closely represents your group's practice regarding ventilator rest settings?**
    a. **All patients are put on protocol-driven settings for the duration of the run, until decision is made to recruit**

b. **Standard initial rest settings, then adjusted based on CXR and disease process**

c. **All cases individualized based on CXR and/or disease process**

d. **All Attendings approach rest settings differently and at their discretion**

6. **Please describe how your approach to question 5 is different for patients with air leak (e.g., pneumothorax)**

   a. **[ ]**

7. **Which ECMO mode is most common at your facility?**

   a. **VV**

   b. **VA**

8. **Which ECMO mode is most commonly used for CDH?**

   a. **VV**

   b. **VA**

9. **How do you currently report CDH runs?**

   a. **Respiratory**

   b. **Cardiac**

10. **Which modes of ventilation does your center use during neonatal ECMO? Select all that apply.**

    a. **HFOV**

    b. **HFJV**

    c. **HFPV (e.g., VDR/Bronchotron/TXP)**

    d. **SIMV, pressure control**

    e. **SIMV, volume targeted**

    f. **Assist Control, pressure control**

    g. **Assist Control, volume targeted**

    h. **PRVC**

    i. **APRV**

    j. **NAVA**

    k. **Extubation**

l. **Other [ ]**

11. Which mode of ventilation is most common or primary?

a. **HFOV**

b. **HFJV**

c. **HFPV**

d. **SIMV, pressure control**

e. **SIMV, volume targeted**

f. **Assist Control, pressure control**

g. **Assist Control, volume targeted**

h. **PRVC**

i. **APRV**

j. **NAVA**

k. **Extubation**

l. **Other [ ]**

12. If high-frequency ventilation is used, under what circumstances is it used?

a. **Preferred mode of ventilation for air leak**

b. **Secondary mode for persistent or severe air leak**

c. **Continuation of pre-ECMO HFV**

d. **Preferred mode of lung rest during ECMO**

e. **Attending-dependent**

13. Do you practice extubation of neonates during ECMO?

a. **No**

b. **Routinely**

c. **Under specific circumstances or indications**

[Describe]

14. If you extubate neonates during ECMO, what support do you put them on while extubated?

a. **Room Air (no support)**

b. **Nasal cannula**

c. **Humidified high-flow nasal cannula**

d. **Nasal CPAP**

e. **NIPPV**

f. **Individualized [describe]**

15. Please indicate your typical initial rest FiO2 (ventilator)

a. **0.21**

b. **0.22-0.30**

c. **0.31-0.40**

d. **0.41-0.50**

e. **> 0.50 [Please describe]**

16. Please indicate your typical <u>initial</u> rest PEEP

a. **3-4**

b. **5-6**

c. **7-8**

d. **9-10**

e. **11-12**

f. **> 12 [Please describe]**

17. Please indicate your typical <u>initial</u> rest peak pressure

a. **12-15**

b. **16-20**

c. **21-25**

d. **26-30**

e. **N/A**

18. Please indicate your typical <u>initial</u> rest TV

a. **3-4 mL/kg**

b. **5-6 mL/kg**

c. **7-8 mL/kg**

d. **> 8 mL/kg**

e. **N/A**

19. Please indicate your typical <u>initial</u> rest inspiratory time

a. **< 0.5 sec**
b. **0.5 sec**
c. **1 sec**
d. **> 1 sec**
e. **Other [Please describe]**
f. **N/A**

20. Please indicate your typical <u>initial</u> rest ventilator rate

a. **< 10**
b. **10-15**
c. **16-20**
d. **21-25**
e. **> 25**
f. **N/A**

21. For HFOV, please indicate your typical/protocol initial rest mean airway pressure

a. **< 8**
b. **8-9**
c. **10-11**
d. **12-13**
e. **14-15**
f. **> 15**
g. **Individualized [Please describe]**
h. **N/A**

22. For HFOV, please indicate your typical/protocol initial rest amplitude

a. **10-15**
b. **16-20**
c. **21-25**

d. **26-30**

e. **Individualized [Please describe]**

f. **N/A**

23. For HFOV, please indicate your typical/protocol initial rest frequency

a. **5-6 Hz**

b. **7-8 Hz**

c. **9-10 Hz**

d. **11-12 Hz**

e. **13-14 Hz**

f. **15 Hz**

g. **Other [describe]**

h. **N/A**

24. If you rest on HFJV, please describe your rest settings

a. **[ ]**

b. **N/A**

25. If you rest on HFPV, please describe your rest settings

a. **[ ]**

b. **N/A**

26. If you rest on APRV, please describe your rest settings

a. **[ ]**

b. **N/A**

27. If a patient is on iNO at ECMO initiation, what do you do with iNO during the run?

a. **Leave it on throughout the run**

b. **Sometimes leave it on**

[Please describe iNO criteria during ECMO]

c. **Always wean it off within 24 hours**

d. **Always turn it off immediately (within 1 hour)**

e. **No, never**

28. <u>During lung rest</u>, what degree of de-recruitment do you accept?

- **a. Use protocol settings, regardless of degree of white-out or aeration**
- **b. Expect and accept complete white-out**
- **c. Expect some volume loss but maintain aeration – complete white-out is unacceptable**
- **d. Depends on the disease process. Explain [ ]**
- **e. Varies with stage of the run (e.g., first 48 hrs, recruiting, weaning, etc.)**

Describe [ ]

29. At what point in the typical, uncomplicated run do you begin active recruitment maneuvers?

- **a. We typically don't – let the lungs open up spontaneously on rest settings**
- **b. After 72 hours**
- **c. After 48 hours**
- **d. After 24 hours**
- **e. Individualized, depending on disease process, fluid status, initial signs of spontaneous recruitment**
- **f. Recruitment? We never let the lungs de-recruit!**

30. Please list common recruitment maneuvers utilized at your facility

- **a. Hand ventilation**
- **b. Bronchoscopy**
- **c. Change ventilator mode**
- **d. Change (increase) ventilator settings**
- **e. Administration of exogenous surfactant**
- **f. Chest physiotherapy**

31. How often do you use bronchoscopy as a component of pulmonary toilet to recruit and/or prepare for decannulation?

- **a. Rarely / not as typical practice**
- **b. Commonly, but not routinely**
- **c. The majority of cases / routinely**

32. Please describe your indications or uses of bronchoscopy

[ ]

For the next 6 questions, assume your patient is weaning from ECMO support and you perform a trial off ECMO. However you define a successful trial, please consider the respiratory support you consider "ready" to come off ECMO non-emergently.

33. What FiO2 meets your threshold for decannulation?

- **a. </= 40%**
- **b. </= 50%**
- **c. < %**
- **d. Other**
- **e. No specific criteria**

34. What PEEP meets your threshold for decannulation?

- **a. </= 5**
- **b. 6-7**
- **c. 8-10**
- **d. Other**
- **e. No specific criteria**

35. What peak inspiratory pressure?

- **a. < 20**
- **b. 21-25**
- **c. 26-30**
- **d. Other**
- **e. No specific criteria**

36. What tidal volume?

- **a. 4-4.9 mL/kg**
- **b. 5-5.9 mL/kg**
- **c. 6-6.9 mL/kg**
- **d. Other**
- **e. No specific criteria**

37. If you come off on HFOV, what mean airway pressure?

- **a. 10-11**

b. **12-13**

c. **14-15**

d. **Other**

e. **No specific criteria**

38. Do you utilize iNO to transition from ECMO?

a. **Rarely**

b. **Commonly, but not routinely**

c. **Almost always / routinely**

39. Do you utilize non-inhaled pulmonary vasodilator therapies (epoprostenol, treprostenil, sildenafil, milrinone, PGE1) to come off ECMO?

a. **Rarely**

b. **Commonly, but not routinely**

c. **Almost always / routinely**

40. Please provide any additional clarifying comments regarding your ventilator management during neonatal respiratory ECMO

a. **[ ]**